

Station #1 (section 2.1)

Sketch the graph of the quadratic function by hand. Identify the vertex and x-intercepts. Use the graphing calculator to check your results.

a) $f(x) = x^2 - 8x + 16$

b) $f(x) = 4x^2 - 4x + 21$

c) $f(x) = -x^2 - 4x + 1$

Station #2 (section 2.2)

Sketch the graph of each polynomial by hand. Use what you know about the degree, leading coefficient, multiple zeros, intercepts, and plotting sufficient points. Check your graph with a graphing calculator.

a) $f(x) = (x + 2)(x)^3$

b) $f(x) = -\frac{1}{4}(x)^2(x - \sqrt{12})(x + \sqrt{12})$

c) $f(x) = -\frac{1}{3}(x + 1)(x - 2)^2$

d) $f(x) = \frac{1}{5}(x + 1)^2(x - 3)(2x - 9)$

Station #3 (section 2.3) – Skills Test

- a) Long divide $4x^3 - 7x^2 - 11x + 5$ by $4x + 5$ and find the remaining factors.
- b) Long divide $x^4 + 3x^2 + 1$ by $x^2 - 2x + 3$
- c) Divide using synthetic division:
 $9x^3 - 18x^2 - 16x + 32$ by $x - 2$
 $5x^3 + 18x^2 + 7x - 6$ by $x + 3$
- d) Evaluate $g(x)$ using the Remainder Theorem if $g(x) = x^6 - 4x^4 + 3x^2 + 2$
for $g(2)$ $g(-4)$ $g(3)$ $g(-1)$
- e) Use synthetic division to verify the upper and lower bounds of the real zeros of f if $f(x) = x^4 - 4x^3 + 16x - 16$ and the upper bound is given as $x = 5$ and the lower bound as $x = -3$.
- f) Use the Rational Zero Test to list all possible rational zeros of f . Use a graphing calculator to verify that the zeros of f are contained in the list.
 $f(x) = x^3 - 4x^2 - 4x + 16$
 $f(x) = 2x^4 - 17x^3 + 35x^2 + 9x - 45$
- g) Use Descartes' Rule of Signs to determine the possible numbers of positive and negative real zeros of the functions
 $f(x) = 2x^4 - x^3 + 6x^2 - x + 5$
 $f(x) = 4x^3 - 5x + 8$

Station #4 (section 2.4)

Perform the operations and write the result in standard form.

a) $(11 - 2i) + (-3 + 6i)$

b) $(6 - 2i)(2 - 3i)$

c) $(1.6 + 3.2i) + (-5.8 + 4.3i)$

d) $(4 + 5i)^2 - (4 - 5i)^2$

e) $\frac{8 - 7i}{1 - 2i}$

Station #5 (section 2.5)

Use all you know to find the zeros of the polynomials, write it in factored form and sketch a graph by hand. Check yourself with a graphing calculator.

a) $f(x) = x^5 + x^3 + 2x^2 - 12x + 8$

b) $f(x) = x^4 + 2x^3 + 10x^2 + 18x + 9$

c) $f(x) = 5x^3 - 9x^2 + 28x + 6$

Answers:

1)

- a) x-int: $x = 4$ vertex: $(4, 0)$
- b) x-int: Non-Real at $\frac{1}{2} \pm \sqrt{5}i$ vertex: $(.5, 20)$
- c) x-int: $x = -4.24, 0.24$ vertex: $(-2, 5)$

2) Check with your calculator

3)

- a) $x^2 - 3x + 1, x \neq -5/4$
- b) $x^2 + 2x + 4 + (2x - 11)/(x^2 - 2x + 3)$
- c) $9x^2 - 16, x \neq 2$
- c) $5x^2 + 3x - 2, x \neq -3$
- d) 14, 3122, 434, 2
- e) answers vary, see page 121 for help
- f) $\pm 1, \pm 2, \pm 4, \pm 8, \pm 16$
- f) $\pm 1, \pm 3, \pm 5, \pm 9, \pm 15, \pm 45, \pm 1/2, \pm 3/2, \pm 5/2, \pm 9/2, \pm 15/2, \pm 45/2$
- g) 4, 2, or 0 positive; no negative
- g) 2 or 0 positive; 1 negative

4)

- a) $8 + 4i$
- b) $6 - 22i$
- c) $-4.2 + 7.5i$
- d) $80i$
- e) $22/5 + 9i/5$

5)

- a) zeros: 1, 1, -2, $2i$, $-2i$ Factors: $(x - 1)(x - 1)(x + 2)(x - 2i)(x + 2i)$
- b) zeros: -1, -1, $3i$, $-3i$ Factors: $(x + 1)(x + 1)(x - 3i)(x + 3i)$
- c) zeros: $1 \pm \sqrt{5}i$ and $-1/5$ Factors: $(x + 1/5)(x - 1 + \sqrt{5}i)(x - 1 - \sqrt{5}i)$